



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

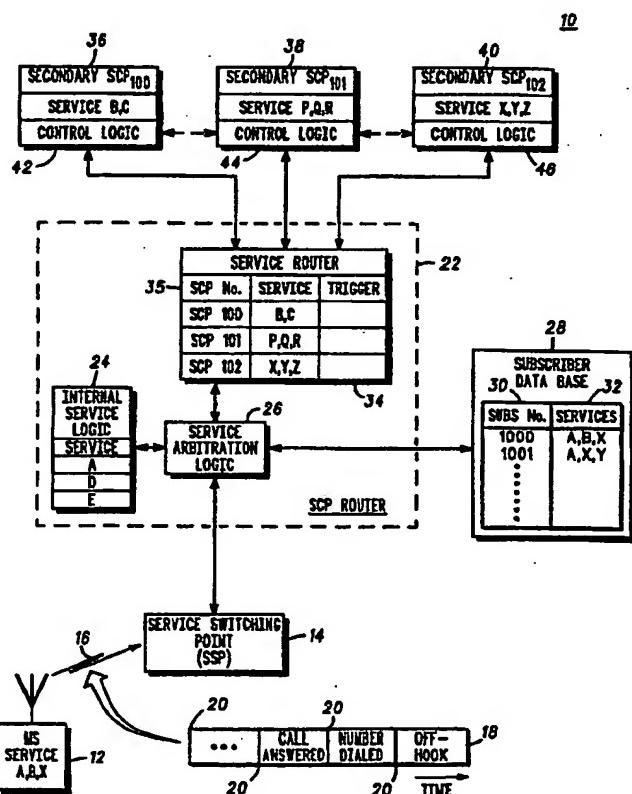
(51) International Patent Classification ⁶ :	A1	(11) International Publication Number:	WO 97/07637
H04Q 3/00, 7/38, H04M 3/42		(43) International Publication Date:	27 February 1997 (27.02.97)

(21) International Application Number:	PCT/EP96/03538	(81) Designated States: CA, CN, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(22) International Filing Date:	9 August 1996 (09.08.96)	
(30) Priority Data:	9517102.1 21 August 1995 (21.08.95) GB	Published <i>With international search report.</i>
(71) Applicant (<i>for all designated States except US</i>):	MOTOROLA LTD. [GB/GB]; Jays Close, Basingstoke, Hampshire RG21 7PL (GB).	
(72) Inventors; and		
(73) Inventors/Applicants (<i>for US only</i>):	CHAMBERS, David [GB/GB]; 33 Sunnydown Road, Olivers Battery, Winchester, Hampshire SO22 4DL (GB). CRICHTON, Paul [GB/GB]; 3 Longmead, Woolton Hill, Newbury, Berkshire RG20 9XY (GB). DODD, Adrian [GB/GB]; 3 Falmouth-way, Thatcham, Berkshire RG19 4GL (GB).	
(74) Agents:	SPAULDING, Sarah et al.; Motorola European Intellectual Property, Midpoint, Alencon Link, Basingstoke, Hampshire RG21 7PL (GB).	

(54) Title: COMMUNICATION SYSTEM AND SERVICE CONTROLLER FOR CALL HANDLING

(57) Abstract

The figure illustrates the architecture of an intelligent network (10). In response to a trigger (20) in a call (18), service arbitration logic (26) of a Service Control Point (SCP) router (22) provides a particular service to a subscriber unit (12) by routing the subscriber unit (12) to a pertinent location in which that particular service logic resides. The location may be in a proprietary, secondary SCP (42-46) belonging to a third party. As such, service functionality may be distributed and controlled between the SCP router (22) and at least one secondary SCP responsive thereto.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

COMMUNICATION SYSTEM AND SERVICE CONTROLLER FOR CALL HANDLING

Background of the Invention

5

This invention relates, in general, to a communication system, and is particularly, but not exclusively, applicable to an intelligent network in which a multitude of communication services may be provided to a subscriber unit in response to a call trigger.

10

Summary of the Prior Art

The evolution of present day communication systems, such as cellular communication systems and landline-based systems, has resulted in the 15 realisation of intelligent networks. As will be appreciated, intelligent networks allow an interaction between a service switching point (SSP), responsible for the control and routing of a call, and a service control point (SCP) for the invocation of an "IN" service resident on the SCP. More particularly, the interaction occurs if "triggers" are invoked at the SSP, 20 which triggers are generated by suitable break-points in a standard communication call model, e.g. when the call produces an off-hook signal or after the call has progressed to the number dialled stage. As such, each trigger may invoke a particular service that is used to establish a call, and that is pertinent to a particular point in time in the sequence of events of 25 the communication call model.

Presently, when a trigger is invoked, there is only one SCP address to contact, which single SCP address provides a solitary service, such as voice, data or video. However, a management problem arises when a 30 subscriber unit wishes to utilise multiple IN service and these multiple services are invoked by the same single trigger in the SSP. Additionally, the rigid architecture of present intelligent networks precludes a third party from providing an IN service from a proprietary SCP, which further limits a subscriber unit's choice (from all potentially available services) 35 and restricts a subscriber unit from obtaining a comprehensive selection of services.

-2-

Accordingly, a need exists for an improved intelligent network architecture that can integrate and manage proprietary services provided by numerous SCPs.

5

Summary of the Invention

According to a first aspect of the present invention there is provided a communication system for providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the
10 subscriber unit during a call, the communication system comprising: a service control point (SCP) router, responsive to the trigger, having a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber unit in the list, the SCP router further comprising means for identifying an address of the at least one
15 subscriber affiliated service in the system and means for invoking the at least one subscriber affiliated service for use by the subscriber unit through the routing of the subscriber unit to the address so identified.

In a second aspect of the present invention there is provided a service controller for call handling in an intelligent network, the service controller providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the subscriber unit during a call, the service controller having: a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber
25 unit in the list; means for identifying an address of the at least one subscriber affiliated service in the system; and means for invoking the at least one subscriber affiliated service for use by the subscriber unit through the routing of the subscriber unit to the address so identified.
30 An exemplary embodiment of the present invention will now be described with reference to the accompanying drawing.

Brief Description of the Drawings

35 FIG. 1 is a block diagram of an intelligent network that provides multiple services to a subscriber unit in response to a call trigger, in accordance with a preferred embodiment of the present invention.

Detailed Description of a Preferred Embodiment

Referring to FIG. 1, there is shown, in accordance with a preferred embodiment of the present invention, a block diagram of an intelligent network 10 that provides multiple services to a subscriber unit in response to a call trigger.

A subscriber unit (which may be a mobile unit) 12 communicates with a service switching point (SSP) 14 via a communication link 16, such as a radio channel or landline. The subscriber unit 12 can command services A, B and X from a range of services provided by the network 10. As will be appreciated, in a mobile communication system, such as the Groupe Speciale Mobile (GSM) pan-European cellular communication system, a mobile switching centre (MSC) performs the tasks of a SSP, and is arranged to intelligently direct mobile terminated calls, for example, to a relevant destination or service. A typical model of a call 18, communicated over the communication link 16, is illustrated in the figure. More particularly, the model of a call 18 comprises a plurality of discrete sections, such as "Off-Hook", "Number Dialled" and "Call Answered". Moreover, the boundaries 20 between these discrete sections provide "trigger" opportunities for the intelligent network, as will be understood by a skilled addressee. In this respect and unlike prior art systems, services A, B and X of subscriber unit 12 may potentially all be triggered from any single boundary event 20.

The SCP 14 is coupled to a (primary) SCP router 22 that is arranged to route particular services to the subscriber unit 12 in response to a triggered request (provided by a suitable boundary 20 in the call). The SCP router 22 comprises internal service logic 24 that provides the necessary logic for services A, D and E, and service arbitration logic (i.e. a processor) 26 coupled to the internal service logic 24 for selecting services and controlling the operation of the SCP router 22. The service arbitration logic 26 is further coupled to a subscriber database 28 that contains listings of subscriber addresses 30 and types of services 32 affiliated thereto. For example, subscriber address "1000" (which corresponds to subscriber unit 12) has services A, B and X associated therewith. As such, in response to

a trigger from an identified subscriber unit, the SCP router 22 is able to invoke the requisite services based on the information in the subscriber database 28. Furthermore, although the subscriber database is shown as a discrete database located outside the physical confines of the SCP router 22,

5 it will be appreciated that the subscriber database may equally well be implemented within the SCP router 22. The service arbitration logic 26 is further responsive to a service router database 34, which database identifies particular services provided by secondary SCPs, for example, (typically through their addresses within the system). More particularly,

10 in the service router database 34 of FIG. 1, an address field 35 is used to identify the locations (memory addresses or physical addresses) of either the internal service logic or the proprietary services that reside outside the SCP router 22. In this way, the service router database 34 is integral in providing/routing the service to the subscriber unit through the

15 identification of the location of the service. Optionally, the service router database 34 may associate particular services with particular triggers, so a particular service will only be invoked by a particular trigger. Although information relating to the trigger is currently shown as residing in the service router database 34, this is not to say that this information need

20 reside at this specific location. Indeed, the information need only be associated with the services affiliated with the subscriber unit.

SCP router 22 is also coupled to secondary SCPs 36-40, which respectively provide services (B and C), (P, Q and R) and (X, Y and Z). Therefore,

25 where necessary, the service arbitration logic 26 is able to route a request for a service (generated by a trigger) to any one of a plurality of secondary SCPs. Therefore, the SSP 14 is able to access a service resident on a secondary SCP, even though the SSP always initially accesses the SCP router 22. Optionally, each secondary SCP may contain control logic 42-46,

30 and may be coupled to at least one other secondary SCP. Therefore, in the event that the SCP router 22 determines that multiple services are to be provided from a single trigger, and that these services are provided on different secondary SCPs 36-40, the control logic 42-46 in the secondary SCPs may be utilised to intelligently re-direct a request for a service

35 between secondary SCPs, rather than via the SCP router 22. As such, processing overhead in the system is reduced.

For the sake of simplicity, only three additional services providers are illustrated, although a network may contain fewer or substantially more. Additionally, these secondary SCPs may be proprietary, third party-owned systems, and may each contain one or more services.

5

In operation, a network operator is responsible for overseeing the operation of the (primary) SCP, i.e. the SCP router 22, that manages the multiplicity of services without the need for additional signalling with the SSP 14. The SCP contains service arbitration functionality that can 10 determine, select and invoke more than one service in response to a trigger (through the identification of the location/address of the service). With respect to selection, two principal methods are available, namely Precedence Arbitration and Subset Arbitration. In this respect, Precedence Arbitration requires services to be logically tested for 15 invocation on a predetermined priority basis. Therefore, if a particular service is not invoked because of prevailing trigger conditions, that particular service possibility is discarded and the next service tested for applicability. In Subset Arbitration, the services are designed such that one service can only be invoked after a more fundamental (precursor) 20 service has been previously invoked and that certain conditions (when required) have subsequently arisen. In either case, the service router database 34 provides a mechanism for directing the subscriber unit 12 to the relevant service logic (whether it is stored within the SCP router 22 or in one of the plurality of secondary SCPs).

25

The present invention therefore advantageously provides a flexible intelligent network having service functions distributed and controlled between the SCP router and at least one secondary SCP responsive thereto. Therefore, the system of the present invention allows optimised system 30 construction through the ability to modify systems to include proprietary third-party services, thereby providing more service opportunities per subscriber.

Therefore, the SCP router 22 acts as a routing node and determines either 35 the dominant service from a plurality of requested services or the order in which services are provided of service requested (both scenarios being triggered from a single boundary 20). As such, the SCP router 22 provides

-6-

an arbitration service over triggers and accordingly routes a call to a proprietary service provider or to the necessary, internal service logic 24 (subject to the arbitration process). Thus, the SCP router is able to manage multiple services and service logic locations without complicating the
5 underlying trigger mechanisms.

Claims

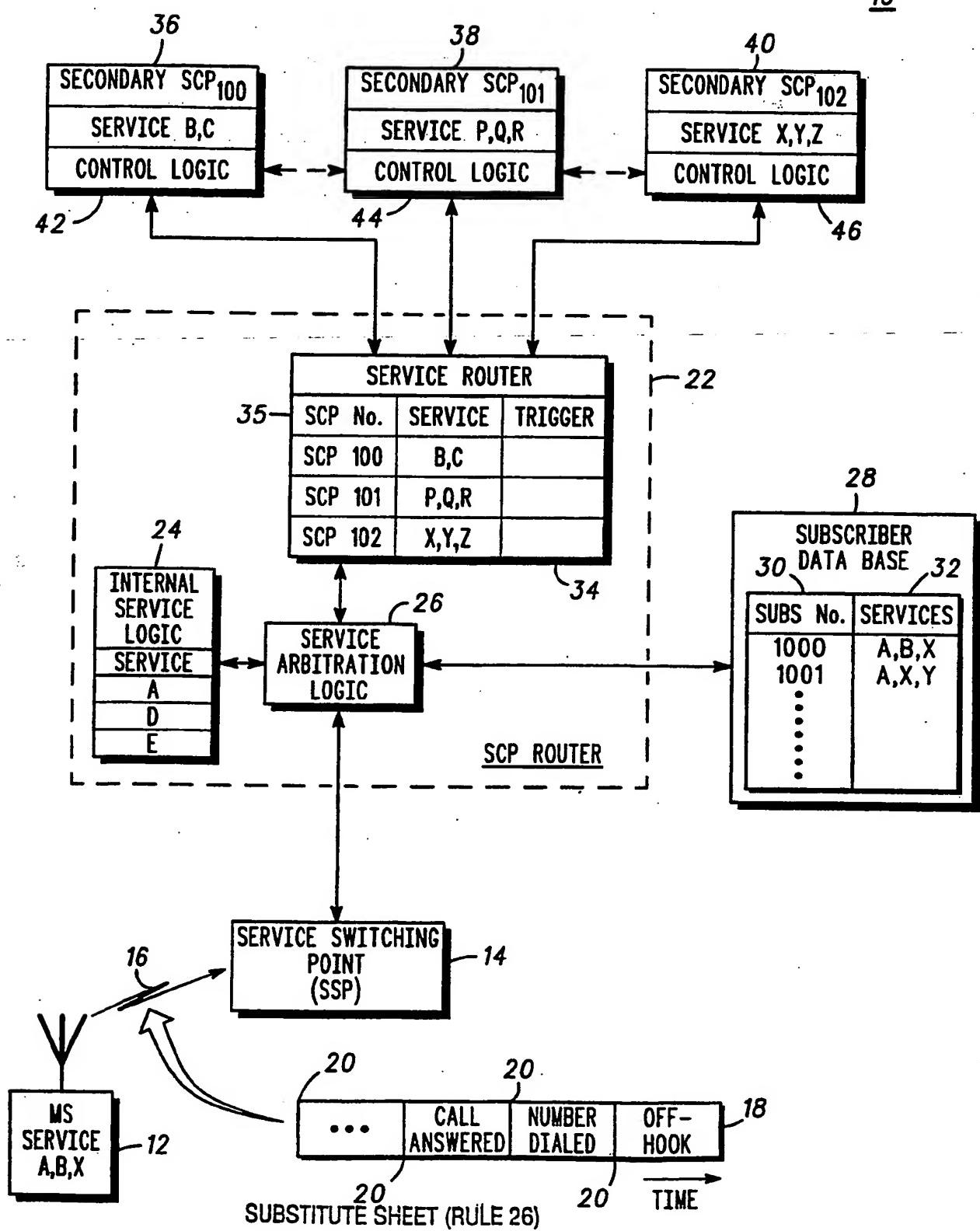
1. A communication system for providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by
5 the subscriber unit during a call, the communication system comprising:
a service control point (SCP) router, responsive to the trigger, having
a subscriber database containing a list of subscriber units and associated
services affiliated with each subscriber unit in the list, the SCP router
further comprising means for identifying an address of the at least one
10 subscriber affiliated service in the system and means for invoking the at
least one subscriber affiliated service for use by the subscriber unit
through the routing of the subscriber unit to the address so identified.
2. - The communication system of claim 1, further comprising a
15 plurality of secondary SCPs each comprising at least one service.
3. The communication system of claim 2, wherein the plurality of
secondary SCPs each comprise control logic and wherein at least one
20 secondary SCP of the plurality of secondary SCPs is coupled to at least one
other secondary SCP of the plurality of secondary SCPs.
4. The communication system of claim 1, 2 or 3, wherein the trigger is
a boundary between sections of a call model.
- 25 5. The communication system of any preceding claim, wherein the
SCP router comprises at least one service.
6. The communication system of any preceding claim, wherein the
means for invoking the at least one subscriber affiliated service logically
30 sequences through the associated services affiliated with a subscriber unit
to invoke a first available service.
7. The communication system of any preceding claim, wherein the
means for invoking the at least one subscriber affiliated service invokes a
35 second service associated with the subscriber unit only after invoking a
first service associated with the subscriber unit.

-8-

8. A service controller for call handling in an intelligent network, the service controller providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the subscriber unit during a call, the service controller having:
 - 5 a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber unit in the list;
 - means for identifying an address of the at least one subscriber affiliated service in the system; and
 - means for invoking the at least one subscriber affiliated service for 10 use by the subscriber unit through the routing of the subscriber unit to the address so identified.
9. The service controller of claim 8, wherein the trigger is a boundary between sections of a call model.
 - 15 10. The service controller of claim 8 or 9, wherein the service controller comprises at least one internal service.
 11. The service controller of claim 8, 9 or 10, wherein the means for 20 invoking the at least one subscriber affiliated service logically sequences through the associated services affiliated with a subscriber unit to invoke a first available service.
 12. The service controller of any one of claims 8 to 11, wherein the 25 means for invoking the at least one subscriber affiliated service invokes a second service associated with the subscriber unit only after invoking a first service associated with the subscriber unit.

1/1

FIG. 1

10

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 96/03538

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04Q3/00 H04Q7/38 H04M3/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04Q H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	IEEE NETWORK, vol. 8, no. 2, March 1994 - April 1994, NEW YORK US, pages 6-16, XP000515075 LAUER: "IN architectures for implementing Universal Personal Telecommunications" see page 9, left-hand column, line 1 - right-hand column, last line see page 12, left-hand column, line 20 - right-hand column, line 19 ---	1,2,5,6, 8,10,11
X	EP,A,0 654 930 (AT & T) 24 May 1995 see column 4, line 53 - column 5, line 40; claim 1 ---	1,6,8,11 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *&* document member of the same patent family

1

Date of the actual completion of the international search

25 November 1996

Date of mailing of the international search report

09.12.96

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax (+31-70) 340-3016

Authorized officer

Lambley, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 96/03538

C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ANNUAL REVIEW OF COMMUNICATIONS, vol. 48, 1994 - 1995, CHICAGO US, pages 557-569, XP000543205 PENKLER ET AL.: "Evolving open Intelligent Networks for global and broadband services" see page 562, left-hand column, paragraph 2 - page 565, left-hand column, paragraph 2; figures 6-11 --- GB,A,2 198 011 (AMERICAN TELEPHONE AND TELEGRAPH) 2 June 1988 see abstract see page 4, line 16 - page 5, line 23 --- INTERNATIONAL SWITCHING SYMPOSIUM, vol. 2, 23 - 28 April 1995, BERLIN DE, pages 31-35, XP000495620 CRAVEN ET AL.: "Evolving subscriber data management in digital switches to provide Personal Communications Services" see page 32, left-hand column, last paragraph - page 34, left-hand column, line 35 --- DE,A,44 41 753 (TELIA AB) 1 June 1995 see abstract see column 5, line 45 - column 6, line 29 -----	1-3,6,8, 11 1,8 1-3,5,8, 10 1,8
A		

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 96/03538

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A-654930	24-05-95	US-A-	5509060	16-04-96
		AU-A-	7777994	25-05-95
		BR-A-	9404667	11-07-95
		CA-A-	2134485	20-05-95
		CN-A-	1111427	08-11-95
		JP-A-	7203032	04-08-95
		NO-A-	944236	22-05-95
-----	-----	-----	-----	-----
GB-A-2198011	02-06-88	US-A-	4899373	06-02-90
		CA-A-	1277791	11-12-90
		JP-C-	1712621	27-11-92
		JP-B-	3079907	20-12-91
		JP-A-	63151156	23-06-88
-----	-----	-----	-----	-----
DE-A-4441753	01-06-95	SE-C-	501943	26-06-95
		AU-A-	7885794	01-06-95
		FR-A-	2713038	02-06-95
		GB-A-	2288302	11-10-95
		NL-A-	9401957	16-06-95
		SE-A-	9303880	25-06-95
-----	-----	-----	-----	-----